

REMARKS

Claims 1-4, 6 and 8-11 are pending in this application. Claim 1 is independent.

The present invention provides a metal sheet with an anticorrosive coating formed from an anticorrosive paint containing metallic zinc powder and at least one kind of metal salt rust inhibitor, where the metal salt is a salt of a metal that is more base than zinc.

Corrosion prevention by zinc has long been known, and metal salt rust inhibitors are also known. Specification at page 4, lines 4-6.

However, the present inventors are the first to find that a marked anticorrosive effect is produced by the *combination* of zinc powder with a metal salt inhibitor, where the metal salt is a salt of the metal which is more base than zinc. Specification at page 4, lines 6-10.

Claims 1-4, 8 and 11 are rejected under 35 U.S.C. § 103(a) over EP 0722933 A1 ("Shinohara"). In addition, Claim 6 is rejected under 35 U.S.C. § 103(a) over Shinohara and further in view of U.S. Patent No. 4,294,808 ("Wasel-Nielen"). Claim 9 is rejected under 35 U.S.C. § 103(a) over Shinohara and further in view of U.S. Patent No. 4,040,842 ("Mekishima"). Claim 10 is rejected under 35 U.S.C. § 103(a) over Shinohara and further in view of U.S. Patent No. 6,117,251 ("Rivera").

Applicants respectfully traverse these rejections because any *prima facie* case of obviousness based on the cited prior art is rebutted by the significant improvement in corrosion resistance, illustrated in the attached Second Declaration Under 37 C.F.R. 1.132, that is achieved by the present invention with a *combination* of zinc powder and metal salt rust inhibitor, where the metal salt is a salt of a metal which is more base than zinc.

Shinohara fails to disclose a range of an amount of metal salt rust inhibitor or the synergistic effect that results from the combination of zinc powder and a salt of a metal more base than zinc. To Shinohara, metal salt rust inhibitor is merely an optional additive. See Shinohara at page 3, lines 55-58. Because the cited prior art is silent about the improved corrosion

resistance that is achieved by the present invention by combining zinc powder and the metal salt rust inhibitor, the rejections under 35 U.S.C. § 103 should be withdrawn.

Applicants also traverse, in particular, the rejection of Claim 6, because any *prima facie* case of obviousness based on the cited prior art is rebutted by the significant improvement in corrosion resistance that is achieved by the invention of Claim 6 with the combination of zinc powder and metal salt rust inhibitor, where the metal salt rust inhibitor is a fine powder having an average particle diameter no larger than 1 μm . The Final Rejection at page 5, section 16, admits that Shinohara "does not teach the use of a metal salt rust inhibitor having an average particle diameter no larger than 1 μm ", but asserts that Wasel-Nielen suggests this feature of Claim 6. However, Wasel-Nielen discloses anticorrosive pigments where at least 90% of the particles have a size between 0.05 and 8 μm . Wasel-Nielen at abstract. Wasel-Nielen is silent about the Claim 6 feature of "an average particle diameter no larger than 1 μm ". Furthermore, the cited prior art fails to suggest the significant improvement in corrosion resistance provided when the average particle diameter is no larger than 1 μm , which is illustrated in the specification at Table 1, reproduced below, by comparing the good corrosion resistance of Sample No. 9 of the present invention having a metal salt (calcium phosphate) average particle diameter of 0.65 μm with the poor corrosion resistance of comparative Sample No. 13 having a metal salt (calcium phosphate) average particle diameter of 2.55 μm .

Table 1

| Sample No. | Metal sheet | Surface preparation | Zinc powder (mass%) | Metal salt rust inhibitor | | | Pitting corrosion resistance | Red rust resistance | Corrosion resistance after coating |
|------------|-------------------------|---------------------|---------------------|--|---|---------------------|------------------------------|---------------------|------------------------------------|
| | | | | Kind | Average particle diameter (μm) | Amount used (mass%) | | | |
| 1 | Cold rolled steel sheet | None | 65 | Aluminum phosphomolybdate | 0.38 | 5.83 | A | A | B |
| 2 | Cold rolled steel sheet | None | 65 | Magnesium phosphate | 0.37 | 5.72 | A | A | B |
| 3 | Cold rolled steel sheet | P (0.8) | 85 | Magnesium phosphate | 0.37 | 2.02 | A | A | A |
| 4 | Cold rolled steel sheet | P (0.8) | 65 | Magnesium phosphate | 0.48 | 6.00 | A | A | A |
| 5 | Cold rolled steel sheet | P (0.9) | 65 | Aluminum phosphomolybdate | 0.35 | 1.63 | A | A | A |
| 6 | Cold rolled steel sheet | P (0.7) | 65 | Aluminum phosphomolybdate | 0.46 | 5.66 | A | A | A |
| 7 | Cold rolled steel sheet | P (0.7) | 65 | Magnesium phosphate plus Aluminum phosphomolybdate | 0.45 0.38 | 1.89 3.52 | A | A | A |
| 8 | Cold rolled steel sheet | P (2.1) | 80 | Magnesium phosphate | 0.89 | 10.3 | A | A | A |
| 9 | Cold rolled steel sheet | P (2.7) | 75 | Calcium phosphate | 0.65 | 4.53 | A | A | A |
| 10 | Cold rolled steel sheet | P (0.3) | 55 | Aluminum phosphomolybdate | 0.75 | 20.3 | A | A | B |
| 11 | Cold rolled steel sheet | P (2.0) | 65 | Magnesium phosphate | 0.89 | 30.5 | B | B | A |
| 12 | Cold rolled steel sheet | P (2.7) | 75 | Calcium phosphate | 1.35 | 6.52 | B | B | A |
| 13 | Cold rolled steel sheet | P (2.2) | 75 | Calcium phosphate | 2.55 | 5.83 | B | B | B |
| 14 | Cold rolled steel sheet | P (2.2) | 38 | Magnesium phosphate | 0.75 | 7.85 | B | C | B |
| (1) | Cold rolled steel sheet | None | None | None | -- | -- | C | D | C |
| (2) | Cold rolled steel sheet | None | 65 | None | -- | -- | C | D | C |
| (3) | Cold rolled steel sheet | P (0.8) | 65 | None | -- | -- | C | D | C |

Parenthesized sample Nos. indicate comparative samples.

In the column of surface preparation, "P" denotes phosphate coating and the parenthesized number that follows P denotes the coating weight (g/m^2).


Because the cited prior art fails to suggest the significant improvement in corrosion resistance that is achieved by the invention of Claim 6 with a combination of zinc powder and the metal salt rust inhibitor, where the metal salt rust inhibitor is a fine powder having an average particle diameter no larger than 1 μ m, any *prima facie* case for the obviousness of Claim 6 is rebutted and should be withdrawn.

In view of the foregoing amendments and remarks, Applicants respectfully submit that the application is in condition for allowance. Applicants respectfully request favorable consideration and prompt allowance of the application.

Should the Examiner believe that anything further is necessary in order to place the application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned attorney at the telephone number listed below.

Respectfully submitted,

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Attachment:

Second Declaration Under 37 C.F.R. § 1.132

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